C8. CHAPTER 8
HAZARD IDENTIFICATION FOR FIREFIGHTING AND EMERGENCY PLANNING

C8.1. SCOPE AND APPLICABILITY

C8.1.1. This chapter establishes standard firefighting hazard identification measures to ensure a minimum practicable risk in fighting fires involving AE. These identification measures are based on the classification of AE fires into four fire divisions according to their predominant hazard. Guidelines are provided to DoD Components for the development of emergency plans, which include safety, security, and environmental protection. These plans shall be coordinated with local authorities.

C8.1.2. The following are outside the scope of this chapter and are the responsibility of the DoD Component:

C8.1.2.1. Firefighting procedures.

C8.1.2.2. Training of firefighting personnel.

C8.1.2.3. Use and maintenance of firefighting equipment and vehicles.

C8.1.2.4. Provision of water supply and alarm systems.

C8.1.2.5. First aid measures.

C8.1.2.6. Other measures required in firefighting.

C8.1.3. AE hazard symbols and supplemental symbols including chemical agent symbols (see section C8.4.) are for firefighting situations.

C8.2. FIRE DIVISIONS

There are four fire divisions. Fire division 1 indicates the greatest hazard. The hazard decreases with ascending fire division numbers from 1 to 4 and is related to HD as shown in Table C8.T1.

Table C8.T1. Fire Divisions

Fire Division	Predominant Hazard	HD
1	Mass explosion	1.1 and 1.5
2	Non-mass explosion, fragment producing	1.2 and 1.6
3	Mass fire, minor blast or fragment	1.3
4	Moderate fire, no blast or fragment	1.4

C8.3. FIRE DIVISION SYMBOLS

C8.3.1. The four fire divisions are represented by four distinctive symbols so that firefighting personnel can recognize the hazards. A fire division number is shown on each symbol. For the purpose of identifying these symbols from long range, the symbols differ in shape as shown in Table C8.T2.

Table C8.T2. Fire Division Symbols

Shape	Fire Division Symbol
Octagon	1
Cross	2
Inverted triangle	3
Diamond	4

C8.3.2. The shape and dimensions of the symbols are shown in Figure C8.F1. This shape and color scheme is consistent with UN, North Atlantic Treaty Organization (NATO), and International Maritime Organization (IMO) requirements. For application on doors or lockers inside buildings, half-sized symbols may be used.

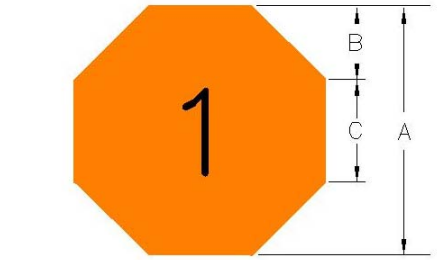
C8.3.3. At the discretion of the DoD Components, circumstances (e.g., security) may make it undesirable to post fire symbols at an AE storage site.

C8.4. CHEMICAL AGENT AND CHEMICAL MUNITION HAZARD SYMBOLS

C8.4.1. The storage of chemical agents and chemical munitions requires the use of chemical hazard symbols. These symbols (see Figures C8.F2. and C8.F3.) shall be used in conjunction with fire symbols, where appropriate. Some of the common chemical agents used in AE, the CG of that AE, and the chemical hazard symbols required in storage are specified in Table C8.T3.

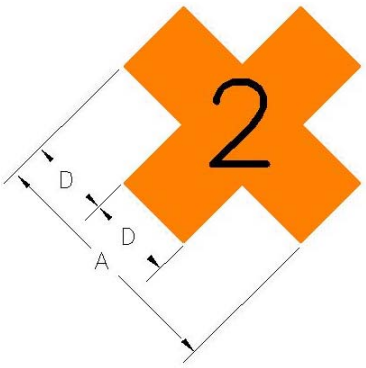
C8.4.2. The following sections describe these symbols, the hazards indicated by the symbols, and the recommended protective clothing and equipment to be used for fighting fires involving these chemical agents and chemical munitions. The DoD Components shall determine protective clothing requirements for other than firefighting situations.

Figure C8.F1. Fire Division Symbols



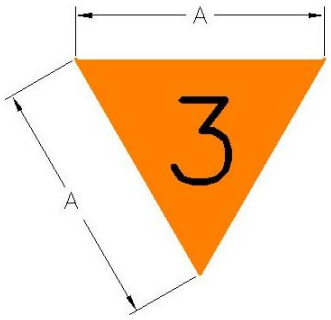
Fire Division 1 or 5

24-inch: NSN 7690-01-082-0290
12-inch: NSN 7690-01-081-9581



Fire Division 2 or 6

24-inch: NSN 7690-01-082-0289
12-inch: NSN 7690-01-087-7340



Fire Division 3

24-inch: NSN 7690-01-081-9583
12-inch: NSN 7690-01-081-9582

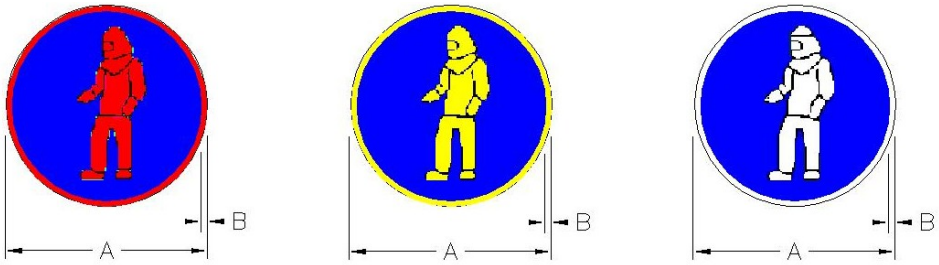
Fire Division 4

24-inch: NSN 7690-01-082-6709
12-inch: NSN 7690-01-081-9584

Dimensions	Large Symbol		Small Symbol	
	inches	metric (mm)	inches	metric (mm)
A	24	610	12	305
B	7	178	3.5	89
C	10	254	5	127
D	8	203	4	102
Letters (height)	10	254	5	127
Letters (thickness)	2	51	1	25

Colors (per Federal Standard 595A or General Services Administration (GSA) Catalog)
Background: Orange #12246
Letters: Black # 17038

Figure C8.F2. Chemical Hazard Symbols

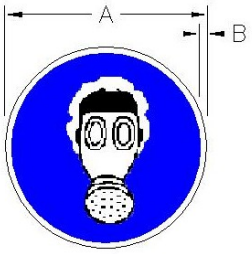


Symbol 1. Wear full protective clothing.
Background is blue, and figure and rim are as follows:

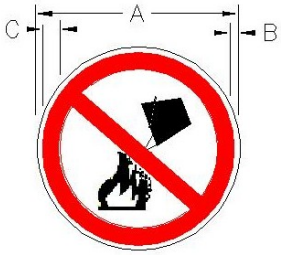
Red for Set 1 Protective Clothing:
24-inch: NSN 7690-01-081-9586
12-inch: NSN 7690-01-081-9585

Yellow for Set 2 Protective Clothing:
24-inch: NSN 7690-01-081-9587
12-inch: Not available

White for Set 3 Protective Clothing:
24-inch: NSN 7690-01-083-6272
12-inch: NSN 7690-01-081-9588



Symbol 2. Wear breathing apparatus.
Background is blue.
Figure and rim are white.
24-inch: NSN 7690-01-081-9589
12-inch: NSN 7690-01-082-0291



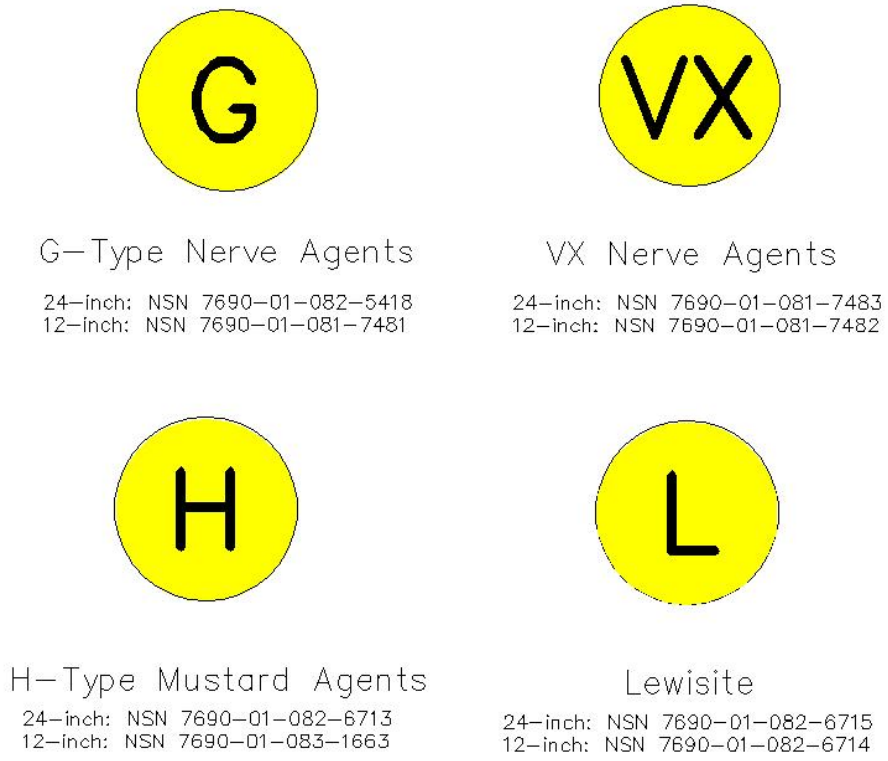
Symbol 3. Apply no water.
Background is white.
Circle and Diagonal are red.
Figures are in black.
24-inch: NSN 7690-01-082-2254
12-inch: NSN 7690-01-082-0292

Dimensions	Large Symbol		Small Symbol	
	inches	metric (mm)	inches	metric (mm)
A	24	610	12	305
B	.5	13	.25	6
C	2	51	1	25

Colors (per Federal Standard 595A or GSA Catalog)

Red #11105
Blue #15102
Yellow #13538
White # 17875
Black #17038

Figure C8.F3. Supplemental Chemical Hazard Symbols



Colors (per Federal Standard 595A or GSA Catalog)
Background: Yellow #13538
Letters: Black # 17038, as follows:

(a) 12 inches [305 mm] high and 2 inches [51 mm] thick on a 24-inch [610 mm] diameter circle.

(b) 6 inches [152 mm] high and 1-inch [25 mm] thick on a 12-inch [305 mm] diameter circle.

Table C8.T3. Compatibility Group and Chemical Hazard Symbols Required for Storage of Chemical Ammunition and Substances

Chemical Agents and Munitions	CG [2]	Full Protective Clothing			Breathing Apparatus	Apply No Water
		Set 1	Set 2	Set 3		
Toxic Agents[1]	K	X				
Tear Gas, O-Chlorobenzol	G		X			
Smoke, Titanium Tetrachloride	G		X			
Smoke, Sulphur trioxide-chlorosulphonic acid solution	G		X			
Smoke, Aluminum-zinc oxide-hexachloroethane	G				X	X
White Phosphorous	H			X		
White Phosphorous plasticized	H			X		
Thermite or Thermate	G				X	X
Pyrotechnic Material	G				X	X
Calcium Phosphide	L				X	X
Signaling Smokes	G				X	
Isobutyl methacrylate with oil	J				X	
Napalm (NP)	J			X	X	X
Triethylaluminim	L			X		X

Notes for Table C8.T3.:

1. Toxic Agents without explosives components that normally would be assigned to HD 6.1 may be stored as CG K.
2. See Chapter 3 for information pertaining to CG.

C8.4.2.1. Set 1 of Chemical Hazard Symbol 1 requires full protective clothing (see Figure C8.F2. and Table C8.T3.) and indicates the presence of highly toxic chemical agents that may cause death or serious damage to body functions. The following full protective clothing shall be used:

C8.4.2.1.1. Service-certified protective gas mask.

C8.4.2.1.2. Impermeable suit.

C8.4.2.1.3. Impermeable hood.

C8.4.2.1.4. Impermeable boots.

C8.4.2.1.5. Impermeable undergarments.

C8.4.2.1.6. Impermeable coveralls.

C8.4.2.1.7. Impermeable protective footwear.

C8.4.2.1.8. Impermeable gloves.

C8.4.2.2. Set 2 of Chemical Hazard Symbol 1 requires full protective clothing (see Figure C8.F2. and Table C8.T3.) and indicates the presence of harassing agents (riot control agents and smokes). The following protective clothing shall be used:

C8.4.2.2.1. Service-certified protective gas masks or Self-Contained Breathing Apparatus (SCBA).

C8.4.2.2.2. Permeable coveralls.

C8.4.2.2.3. Protective gloves.

C8.4.2.2.4. Firefighting personnel equipped with normal heat-resistant clothing (e.g., bunker suit) and gas mask or SCBA do not require the set 2 protective clothing.

C8.4.2.3. Set 3 of Chemical Hazard Symbol 1 requires full protective clothing (see Figure C8.F2. and Table C8.T3.) and indicates the presence of WP or other spontaneously combustible material. The following protective clothing shall be used:

C8.4.2.3.1. Service-certified protective gas masks or SCBA.

C8.4.2.3.2. Flame-resistant coveralls.

C8.4.2.3.3. Flame-resistant gloves.

C8.4.2.3.4. Firefighting personnel equipped with normal heat-resistant clothing (e.g., bunker suit) and gas mask or SCBA do not require the set 3 protective clothing.

C8.4.2.4. Chemical hazard symbol 2 requires the wearing of breathing apparatus (see Figure C8.F2. and Table C8.T3.) and indicates the presence of incendiary or readily flammable chemical agents that present an intense radiant heat hazard. Protective masks shall be used to prevent inhalation of smoke from burning incendiary mixtures.

C8.4.2.5. Chemical hazard symbol 3 warns against applying water (see Figure C8.F2. and Table C8.T3.) and indicates a dangerous reaction will occur if water is used in an attempt to extinguish fire.

C8.5. FIREFIGHTING MEASURES

C8.5.1. Firefighters should have a thorough knowledge of the hazards associated with AE fires and expected AE reactions. The DoD Component shall brief the firefighting forces and other essential personnel before approaching the scene of the fire. They shall be informed of the known hazards and conditions existing at the fire scene prior to proceeding to the fire location.

C8.5.2. Fires involving AE will be fought according to the HD, fire division, the progression of the fire, and the procedures specified by the DoD Component. Special firefighting instructions addressing AE hazards will be developed according to the needs of the DoD Component.

C8.5.3. All fires in the vicinity of AE shall be immediately reported and:

C8.5.3.1. Shall be fought if not involving AE.

C8.5.3.2. Shall not be fought if the fire involves AE, or is supplying heat to the AE, or is so large that it cannot be extinguished with the equipment at hand. Personnel shall be evacuated per paragraph C8.5.4.

C8.5.4. Emergency Withdrawal Distances. Commanders are responsible for developing evacuation plans that include the applicable withdrawal distances as part of the installation's emergency planning (see section C8.6.).

C8.5.4.1. Nonessential Personnel. These emergency withdrawal distances are intended for application in emergency situations only and are not used for facility siting.

C8.5.4.1.1. The initial withdrawal distance for nonessential personnel shall be at least IBD for the PES involved. If the fire involves AE, AE involvement is imminent, or the fire is or may become uncontrollable, then use the emergency withdrawal distances listed in Table C8.T4. The emergency withdrawal distances depend on fire involvement and on whether or not the HD, fire division and quantity of explosives are known. If fire is not affecting AE or involvement is not imminent, then emergency authorities shall determine the withdrawal distance based on the situation at hand.

C8.5.4.1.2. Structures or protected locations offering equivalent protection for the distances in Table C8.T4. may be used in lieu of relocating personnel from the structure or location to the specified emergency withdrawal distance.

C8.5.4.2. Essential Personnel. Emergency authorities on site shall determine the withdrawal distance for essential personnel at accidents. Emergency authorities shall determine the essential personnel.

C8.5.5. AE containing both explosives and chemical agents (see Table C8.T3.) requires special attention and precautions in firefighting. Fires involving such AE shall be fought in accordance with their fire division characteristics. Responding personnel must consider the additional hazards and precautions discussed in Chapter 11 for the chemical agents involved.

C8.5.6. Entry to underground storage facilities following a fire or explosion requires special precautions. Emergency personnel shall monitor for the presence of toxic fumes or oxygen-depleted atmospheres and evaluate structural damage during initial entry following an accident. Commanders shall develop written procedures that define actions to be taken in such emergency situations.

C8.6. EMERGENCY PLANNING

C8.6.1. Installations or responsible activities shall develop Standard Operating Procedures (SOP) or plans designed to provide safety, security, and environmental protection for accidents involving AE. Plans shall be coordinated with the applicable Federal, State, and local emergency response authorities (e.g., law enforcement, fire departments, and hospitals) and any established Local Emergency Planning Committees (LEPC). The SOP or plans shall include the following:

C8.6.1.1. Specific sections and guidance that address emergency preparedness, contingency planning, and security. (For security, the SOP or plans shall limit access to accident sites to trained and authorized personnel.)

C8.6.1.2. Procedures that minimize the possibility of an unpermitted or uncontrolled detonation, release, discharge, or migration of AE out of any storage unit when such release, discharge, or migration may endanger human health or the environment.

Table C8.T4. Emergency Withdrawal Distances for Non-Essential Personnel[1]

HD	UNKNOWN QUANTITY (ft) [m]	KNOWN QUANTITY (ft) [m]
Unknown, located in facility, truck and or tractor trailer	4,000 *[1,219]*	4,000 *[1,219]*
Unknown, located in railcar	5,000 *[1,524]*	5,000 *[1,524]*
1.1[2] and 1.5	Same as unknown facility, truck,trailer, or railcar as appropriate	For Transportation: NEWQD ≤ 500 lb D = 2,500 ft *NEWQD ≤ 226.8 kg* *D = 762 m* NEWQD > 500 lb D = 5,000 ft for railcars D =4,000 ft for other modes *NEWQD > 226.8 kg* *D = 1,524 m for railcars* *D =1,219 m for other modes* For bombs and projectiles with caliber 5-in [127 mm] or greater D = 4,000 ft D = 1,219 m For Facilities: NEWQD ≤ 15,000 lb D = 2,500 ft *NEWQD ≤ 6,804 kg* *D = 762 m* 15,000 lbs < NEWQD ≤ 55,285 lbs D = 4,000 ft *6,804 kg < NEWQD ≤ 25,077 kg* *D = 1,219 m* NEWQD > 55,285 lbs $D = 105W^{1/3}$ *NEWQD > 25,077 kg* $D = 41.65Q^{1/3}$
1.2[2] and 1.6	2,500 *[762]*	2,500 *[762]*
1.3	600 *[183]*	Twice IBD with a 600 ft (183 m) minimum (C9.T13)
1.4	300 *[91.5]*	300 *[91.5]*

Notes for Table C8.T4.:

1. Emergency withdrawal distances do not consider the potential flight range of propulsion units.
2. For HD 1.1 and HD 1.2 AE, if known, the maximum range fragments and debris shall be thrown (including the interaction effects of stacks of items, but excluding lugs, strongbacks, and or nose and tail plates) may be used to replace the distances given.

C8.6.1.3. Provisions for prompt notification to emergency response and environmental agencies and the potentially affected public for an actual or potential detonation or uncontrolled release, discharge, or migration of AE that may endanger human health or the environment.

C8.6.1.4. Provisions for complying with sections 11001-11022 of title 42, U.S.C. (commonly known as the "Emergency Planning Community Right-To-Know Act (EPCRA)") (Reference (~~n~~*o*)), and DoD or DoD Component implementing policies.